Pearls About Swine

How Emergency Departments Are Coping With the Surge of H1N1

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Emergency physicians reporting for work this autumn kept an ear cocked for an unwelcome sound: the symphony of coughing that signaled a waiting room full of flu patients.

The novel H1N1 influenza overloaded emergency departments (EDs) when it arrived in April 2009, and in many EDs remained a problem through the summer. With the advent of cooler weather, children's return to school, and the expected start of the regular flu season, doctors and department directors forecasted an onslaught, and wondered whether their units could summon the surge capacity to work through the crisis without increasing boarding or lengths of stay.

Many were reluctantly convinced that the answer would be, "No."

The novel H1N1 flu, which surfaced in Mexico and Southern California in April[1] and was declared a pandemic strain by the World Health Organization in June,[2] arrived after years of warnings that the emergency medical system has no surge capacity to respond to epidemics or mass disasters. Those warnings were aired in the Institute of Medicine's 3-volume report, "The Future of Emergency Care" in 2006,[3] and also in a journal article from that same year,[4] which calculated that caring for victims of a severe pandemic would require 4.6 times as many intensive care beds and twice as many non-ICU beds as the United States possesses.

The predictions began to become reality in early summer, when EDs experienced an initial wave of flu-like illness and fever cases—and also "worried well" seeking flu tests—immediately after H1N1 emerged. In some cities, that early wave receded. In others, the count of flu cases climbed throughout the usually flu-free summer months.

"I have never before, in a 28-year career, seen flu in June, July and August, but we had it, and it was all in teens and young adults," said David W. Munter, MD, emergency department director at Sentara Obici Hospital in Suffolk, Va. "We had no summer dip (in cases) at all."

"The months of May, June and July were 3 of our top 6 months ever, in terms of emergency department volume, going back at least 10 years," said Brian J. Zink, MD, chair of emergency medicine at Warren Alpert Medical School at Brown University in Providence, RI.

FIRST WAVE

Many emergency physicians say that most of the cases produced by that first wave did not need to be admitted, but could be discharged from the ED to recover at home. But the increased patient load nevertheless "increased our wait times and reduced efficiencies," Dr. Zink said. "Individuals who needed to be wearing masks, we had to stop and get masked in triage, so it slowed the triage process down. And we went into rooms masked and using contact precautions, which adds a little bit of time to each encounter. But we see 100,000 patients a year in our main hospital (ED), so if you add even a few minutes to each patient, it slows everything down."

That experience has created apprehension that the fall wave of H1N1—which began in late August in the Southeast, where children return to school well before Labor Day—would significantly perturb the emergency system, particularly if seasonal flu also arrives on schedule, or if H1N1 flu undergoes enough mutation to add virulence to its established contagiousness.

"From what I have been reading, the flu season in the Southern Hemisphere has been very, very bad—they have been swamped with an increasing number of cases," said Stuart Bradin, DO, an assistant professor of pediatrics and emergency medicine in the University of Michigan Health System. "So I think we are in quite a bit of danger of having a very bad flu season here. Having seasonal flu on top of that, and considering that the pandemic flu strain may become more virulent than its initial presentation, I think is the potential for a perfect storm."

In early September, Thomas Frieden, MD, director of the Centers for Disease Control and Prevention, acknowledged that the Southern hemisphere's flu season, composed almost entirely of H1N1 cases, may prefigure North America's. Southern hemisphere hospitals "had challenges to keep up with the number of people coming in," he said in a news briefing, even though there was "no increase in the level of severity, no increase in the death rate."[5] That admission came a few weeks after the President's Council of Advisors on Science and Technology estimated that H1N1 flu will infect 30% to 50% of the US population this coming winter, leading to as many as 1.8 million hospital admissions that could include 300,000 patients requiring placement in an intensive care unit. From 30,000 to 90,000 Americans could die, the report said, up to 3 times as many as die from flu in a normal year.[6]

Emergency medicine's concern over the potential impact of H1N1 flu is so deep that in July, the American College of Emergency Physicians issued a "National Strategic Plan for Emergency Department Management and Outbreaks of Novel H1N1 Influenza."[7] The plan, written under con-

tract to the Department of Health and Human Services, walks ED directors through a potential H1N1 scenario, lists vulnerabilities that may prove to be weak points, and compiles 27 essential capabilities that EDs must fulfill in order to handle significant new demand.

THE PRINCIPLE UNCERTAINTIES

Physicians' concern for H1N1 turns on multiple uncertainties. So far, according to the CDC, H1N1 causes minor illness for the most part, though it has proved serious and fatal to younger children, pregnant women, and people with certain chronic conditions.[8] Mildly ill patients, however, nevertheless take time to triage, assess and treat; their presence may increase lengths of stay for the entire ED; and they may pose an infection risk to other patients in the waiting room or in treatment areas.

In some cases, however, H1N1 causes illness severe enough to require ICU treatment and mechanical ventilation lasting for more than a week.[9] If that were broadly true, ICUs in turn could become overloaded, creating the ripple effect through a hospital that results in ED boarding.

"When the hospital fills up and I am holding 3, 5, 10 patients, the emergency department comes to a grinding halt," Dr. Munter said.

"If we have another bad flu season, it could make for a very difficult boarding situation," concurred Enrique Enguidanos, MD, medical director of the emergency department at Providence Everett Medical Center in Washington state, whose ED saw an 8% rise in census due to both unseasonal flu and the poor local economy.

And there is no guarantee that severely ill H1N1 patients will not be considered an infection risk as well. "We have so many cancer patients here that I wonder whether intensive care will want" H1N1 patients in proximity, Dr. Bradin said.

Many hospitals have been planning for pandemic flu for years, since avian flu H5N1 began spreading across the globe in 2003, or at least since the National Strategy for Pandemic Influenza was published in 2005.[10] But many of those plans were based on the assumption that the next pandemic strain would be H5N1 or something like it, a strain that is highly virulent but so far has not been highly communicable. H1N1, on the other hand, mostly does not cause severe disease, but is contagious enough to spread through a community very rapidly. In the Southeast, for instance, schools recommenced in August, and by early September local hospitals were reporting daily censuses of pediatric patients that were almost double their usual numbers.

At the Penn State University College of Medicine, pandemic plans call for "blowing up a tent outside the emergency department when we reach predetermined thresholds, providing a medical form of social distancing," said Thomas E. Terndrup, MD, professor and chair of the department of emergency medicine. In Rhode Island, joint planning for a severe pandemic includes using schools as staging centers and the municipal arena as an alternative care site, Dr. Zink said.

SURGE PROTECTION

But the likelihood of H1N1 outbreaks has forced a shift in thinking, away from H5N1-focused fears of grave illness and a 60% case-fatality rate,[11] and toward considerations of what large numbers of what Dr. Munter called "miserable but not severely ill" will do to the smooth running of EDs. The focus is both on keeping low-acuity patients from occupying beds that might be needed by sicker patients, and also from infecting the frail or chronically ill who might be waiting for care nearby.

Some hospitals believe their existing pandemic plans, which essentially relocate triage to outside the hospital and bring health care personnel out from the ED to the relocated patients, will still be useful if waiting room queues grow long. In Virginia, Dr. Munter envisions physically dividing his hospital's waiting room into 2 zones; one, a flu zone, would feed into a predesignated isolation area within the ED. And Children's Healthcare of Atlanta, which operates 3 pediatric hospitals and multiple satellite clinics, has placed an interactive assessment tool on its Web site that guides worried parents through a decision tree of when to take a feverish child to the ED—with the unspoken goal of preventing visits by children who may not need urgent help.[12]

The various plans have some emergency professionals wondering whether the arrangements will nudge the edges of what is permissible under EMTALA, the

federal Emergency Medical Treatment and Labor Act that guarantees at least assessment and stabilization to any patient who seeks care. Against that possibility, physicians place the alternate vision of an ED overwhelmed with H1N1 cases: "a constant surge that would overwhelm our capacity to care for, not just the flu, but everything," Dr. Zink said. "Right now when we have surge days and get over capacity and the hospital gets full, we can count on getting back to normal functioning in a few days—but in a flu pandemic that may not necessarily be true."

ALTERNATE PATHWAYS

Some physicians and planners worked over the summer to design alternate ways of processing what they believe will be large numbers of flu patients, some seeking reassurance, others needing minimal or significant care.

"It is unrealistic to expect that every patient will listen to the news and the CDC's recommendations" and stay away from the ED, said Joseph "Jody" Crane, MD, MBA, business director of the Fredericksburg Emergency Medical Alliance in Maryland. As a faculty member at the Institute for Healthcare Improvement, Dr. Crane is co-author of a soon-to-be-published paper that proposes creating a fast track-like "flu pathway" to handle the influx. The paper calls not only for putting patients into contact precautions and a segregated holding area as soon as they are triaged, but also for employing greater than usual amounts of point-of-care testing to assess patients and steer them to appropriate care. The patients would not enter the main ED unless successive assessments from point-of-care test results revealed that they should—or that they should go immediately upstairs.

"If emergency departments do nothing but throw people in rooms and then subject them to the same old workup we do to every patient, it will be a national crisis for ED beds," Dr. Crane said.

Other physicians, though, see in H1N1 an opportunity for an even more wholesale reconsideration of emergency department management. Peter Viccellio, MD, vice chair of the department of emergency medicine at Stony Brook University Medical Center and creator of the "full-capacity protocol" that alleviates boarding by moving patients up to the floors where they are destined to be admitted, said EDs will be vulnerable to surge-related delays and boarding unless they make significant changes in when they round, how they staff on weekends, and when they discharge.

His greatest concern about the approach of H1N1, he said, is that the new flu will not arrive as an onslaught of cases, but instead will execute a slow climb up the epidemic curve. An onslaught, he said, would be recognized as a crisis and would trigger a coordinated response in the same way a plane crash does. But a steady increase, though it might eventually reach disastrous proportions, might be perceived by policymakers and the public as no different from EDs on any bad day.

Dr. Crane, of the Institute for Healthcare Improvement, agreed. "Our fear is that it will hit hard enough to really disrupt emergency department operations, but not hard enough to engage crisis management protocols," he said. "That could wreak havoc on the running of emergency departments."

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